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24. Зависит ли цвет Луны от обработки фотоплёнки?

13-16 minutes

As soon as the conversation begins that the color of the lunar surface in the photographs in the Apollo missions is transmitted incorrectly (the lunar soil should be brown, not gray), then NASA propagandists rush to protect NASA's lunar images. Recalling their youthful experience of developing photographic films, they begin to assert that photographic film cannot reproduce colors correctly at all.

Basically, the arguments of NASA's defenders boil down to two points:

1. All color photographic and cinematographic films distort the color rendition in comparison with its perception by the human eye.

2. Additionally, color distortion occurs during chemical processing. Different solutions are used for processing - developer, fixer, bleach - all this is unstable, and therefore does not give repeated results.

And even cosmonaut Alexei Leonov, defending the American scam with landing on the moon, said that the color of the moon in the pictures is always different, since "the result depends on the processing of the photographic film." Told about itV. Lagovsky in "Komsomolskaya Pravda":

> *The USSR pilot-cosmonaut Alexei Leonov, who was friends with Stafford, explained to me about the color of the moon at one time: the whole thing is in the film on which they were filming, and in the reflectivity of the surface.*
>
> *“Each person perceives light in his own way,” said Alexey Arkhipovich. - One seems to have a brown shade, to another - a different shade. And photography is artificially invented layers. Any film is three colors. And a combination of three colors. The result depends on the processing. Depends on the angle of the light flux. One position of the luminous flux - one color. The sun is rising - a different color. The same color surface can reflect different wavelengths depending on the angle. And this is a different color.*
>
> I trust Alexei Arkhipovich. But I still don't understand: at first the Moon reflected in such a way that it was brown, and then it began to reflect in such a way that it became black and white on color film. And now she is brown again - in the Chinese photographs.

I will not discuss A. Leonov's phrase "The sun rises - a different color." It is very ambiguous. If we were talking about the Earth, it would be clear that as the sun rises, the color changes due to the passage of the rays of a different path in the atmosphere. But there is no atmosphere on the moon that changes the color of the sun with altitude. It is possible that Leonov simply did not put it that way.

I will focus on two topics related to film only. The first is that photographic film allegedly does not correctly reproduce colors and that the processing process greatly affects color reproduction. This is the second thesis.

First, about the color rendition. I think that no one will dispute the thesis that Kodak film is the best in the world in terms of color rendering, especially if the packaging has the inscription "Kodak Professional". Kodak specialists made every effort to bring the color reproduction to perfection. A lot of money was allocated for this, and entire research teams were engaged in the improvement of film and photographic materials.

According to the Kodak ideology, the color rendering is considered correct if the "recognizable" colors are correctly reproduced: human skin, blue sky, green grass, while the gray scale is reproduced without a color cast. The most famous in the world for assessing color rendition is the Macbeth scale.

Macbeth Color Checker.

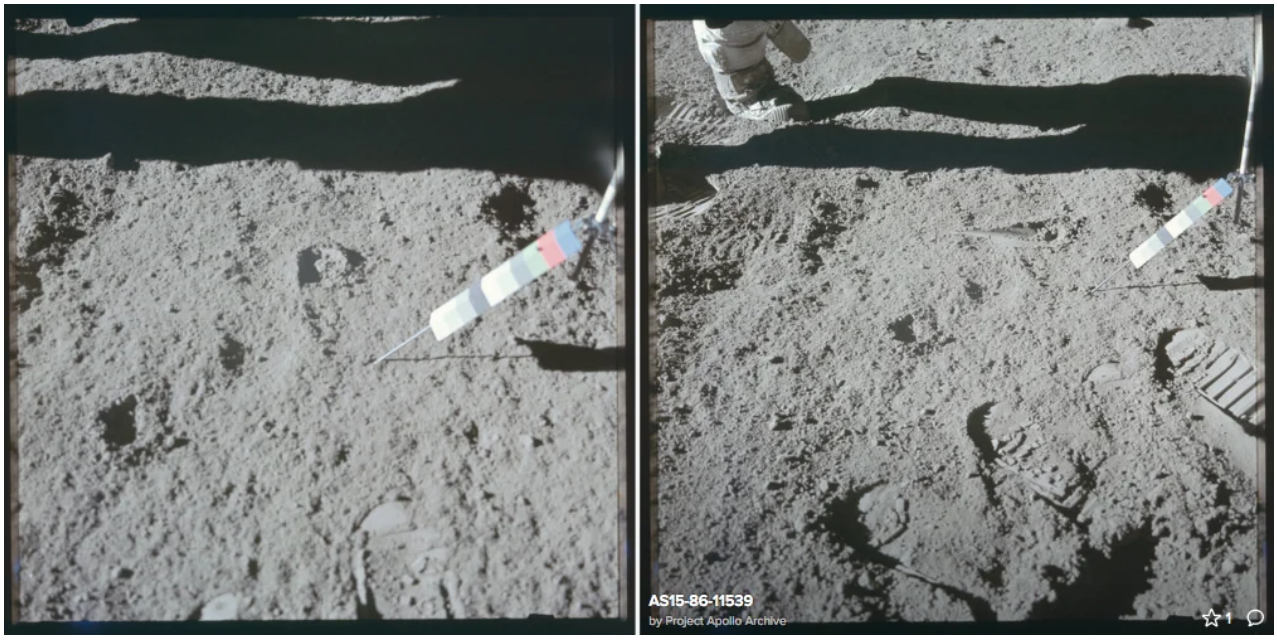
In the uppermost row, from left to right, there are fields depicting the skin of a Negro, the skin of a European, blue sky, green grass, blue-purple flowers, which are widespread in the United States. The left square of the second row is an orange skin, and at the very bottom is a scale of gray tones, from white to black. Above the gray-black fields are three colors of subtractive synthesis - yellow, purple and blue, and in the same row on the left - three colors of additive synthesis, RGB.

Professional photographic film must correctly reproduce the colors of this table. Moreover, the assessment of color rendition begins on the condition that the gray fields are transmitted as monochrome. The table begins (top) with a brown tone and ends with a gradation of gray tones. The most attention is paid to these tones. Therefore, it can be unambiguously asserted that the transmission of gray and brown tones on photographic films is put at the forefront. If the gray field looks neutral, then the brown color is accurately reproduced. But all the talk about the color of the moon's surface just revolves around the shades of gray and brown.

For a correct assessment of the color rendering of objects, a color target is introduced into the frame. For example, here is one of the first color photographs of the lunar soil, taken by Surveyor 3 in April 1967 - next to the base of the apparatus is a color calibration scale with gray sectors.

Support of the Surveyor-3 apparatus together with a calibration scale (color target). Photo by NASA.

And here it is below - as if the astronauts of the Apollo 15 mission are photographing the surface of the Moon "close-up". It is clearly seen that the gray areas on the calibration scale are rendered without a color cast. At the same time, the surface of the moon is cement gray. This is exactly how NASA imagined the color of the moon 50 years ago - not brown, but neutral gray, like ash.



Frame with a calibration color scale. Apollo 15.

Defenders of NASA insist that each time the result of color rendering depends on the processing of photographic film. It was this "song" that Aleksey Leonov also picked up, saying that the result depends on the processing.

Of course, only people who do not understand the real process of processing film and photographic films can reason like this. The NASA defender speaks like an amateur high school photographer, not a professional

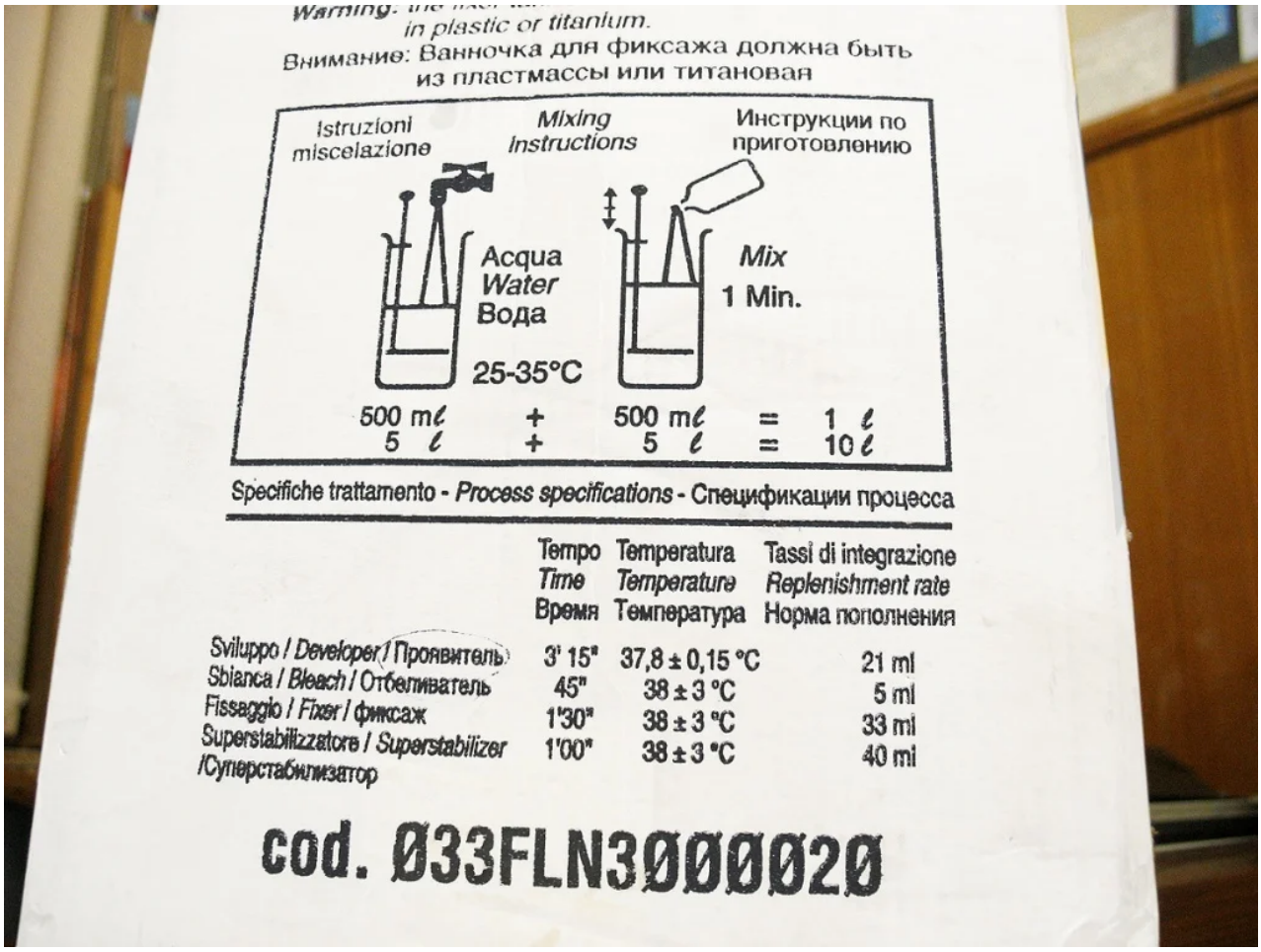
familiar with the topic. What distinguishes an amateur photographer from a professional? The amateur photographer, when he begins to develop his photographic material, takes out the developer that has soured six months ago from under the bed, does not measure the temperature of the solution, immediately pours the developer into the tank, half spilling it onto the floor. And, forgetting to turn on the stopwatch, he goes to watch TV. Then he suddenly realizes that he has a development process in the next room, runs to the tank in order to quickly pour out the developer and fill in the fixer. Grabbing the tank, he stumbles, while the tank falls and opens. The damp film falls out onto the dirty floor. The amateur photographer immediately shoves her back. She does not want to get back on the spirals of the tank, so he crumples it with both hands, pushing it inside, and finally slams the lid. Defenders of NASA, recalling their school experience of amateur photography, think that the development of valuable film photographs follows the scheme described above - as photographic amateurs once developed film in the bathroom. Therefore, they sincerely believe that "the result depends on the processing." In fact, in a professional laboratory, the result is always the same. Firstly, the processing takes place not manually, but in developing machines, and secondly (and this is the most important thing), the whole process is strictly standardized and does not allow deviations. Remembering their school experience of amateur photography, they think that the development of valuable film photographs follows the scheme described above - as photographic amateurs once developed film in the bathroom. Therefore, they sincerely believe that "the result depends on the processing." In fact, in a professional laboratory, the result is always the same. Firstly, the processing takes place not manually, but in developing machines, and secondly (and this is the most important thing), the whole process is strictly standardized and does not allow deviations. Remembering their school experience of amateur photography, they think that the development of valuable film photographs follows the scheme described above - as photographic amateurs once developed film in the bathroom. Therefore, they truly believe that "the result depends on the processing." In fact, in a professional laboratory, the result is always the same. Firstly, the processing takes place not manually, but in developing machines, and secondly (and this is the most important thing), the whole process is strictly standardized and does not allow deviations. In fact, in a professional laboratory, the result is always the same. Firstly, the processing takes place not manually, but in developing machines, and secondly (and this is the most important thing), the whole process is strictly standardized and does not allow deviations. In fact, in a professional laboratory, the result is always the same. Firstly, the processing takes place not manually, but in developing machines, and secondly (and this is the most important thing), the whole process is strictly standardized and does not allow deviations.

10-15 years ago, when the quality of pictures on the phone left much to be desired, many took pictures on color negative film and then printed positives on photographic paper in a minilab. Those who are over 20-25 years old probably remember how in all large department stores there were minilabs for developing negative photographic film and printing photographs.

This is what the C-41 color negative film processing process looks like.
1. Development - 3 minutes 15 seconds at **37.8 ± 0.15 ° C**
2. Whitening - 45 seconds
3. Setting - 1 minute 30 seconds
4. Stabilization - 1 minute
5. Drying

The temperature of the developer was controlled with an automatic relay with an accuracy of 0.15 degrees.

The chemical composition of the developer has always been the same. The fact is that no one bought chemicals for processing in the form of individual dry substances and did not hang them on the scales, as amateur photographers did in the USSR. Firstly, no one specifically knew the composition of the developer, it was a trade secret of Kodak. And secondly, the darkroom simply bought concentrates in 5-liter cans and added water before use (according to the instructions). For example, to make 1 liter of fixer working solution, it was necessary to take 500 ml of water and pour 500 ml of concentrate into it.



Instructions (on a cardboard box) for preparing fixer from a concentrate.

The recipe, once developed, has not changed for decades. Large dark laboratories checked the content of basic substances in solutions every morning before development. With the help of chemical reactions, this was done by the workers of KIL - a control and measuring laboratory, which was part of the film processing workshop. When the solutions are ready, at first, not the material is developed, but a special test - the sensitogram. In dark laboratories, the sensitogram is called in the English manner - strip. This is how it looks:

Strip for control of film processing.

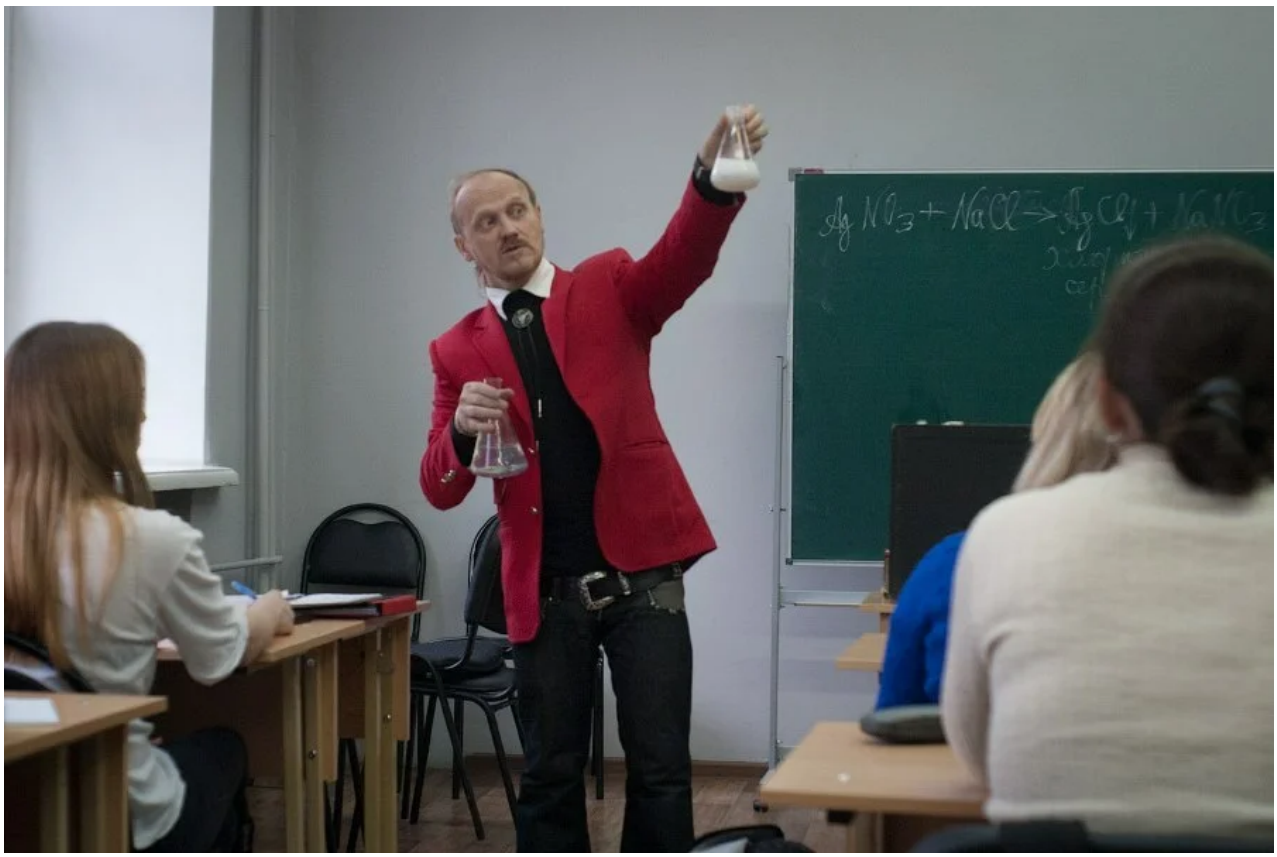
Three key densities are measured in this strip: HD - High Density, LD - Low Density, Dmin - minimum density. These three fields serve to control the quality of the developer's work - in high, low and veil density. The other two fields Y and Dmax are used to control the completeness of whitening.
These fields are measured with a densitometer and compared with a REFERENCE - the same strip, but developed in a large certified Kodak laboratory, or - as here - Konika. Photolabs bought a roll of undeveloped strips in an iron box and, along with it, one standard development sample.
Each working day begins with the fact that at first the duty strip appears, it is compared with the standard, and only after that the technologist gives the go-ahead for the development of the material.
Therefore, in any laboratory, the processing process is maintained unchanged throughout the year.
If there is a deviation from the standard by more than a certain value, the process stops until the reasons are clarified, and the material is not processed.

The amateur photographer handles his material differently. He brought in the solutions, cooled them to the desired temperature, and began to develop. And in the darkroom, after filling the car with solutions, it took a whole day or even two to reach the reference processing mode.

A person who imagines how the process of processing photographic material in a developing machine will, of course, laugh at the words of NASA defenders when they, as color instability in Apollo photographs (and the fact that the color on photographic materials does not look like the color visible to the eye) leads to such a factor like processing instability. **In a large laboratory, there simply cannot be instability. In addition, the processing does not affect the color change. Processing gives the same results all the time. The chemicals are the same all the time, the process is the same, and it is kept accurate to within seconds. In addition, the stability of processing in the laboratory is monitored daily using strips (sensitograms).**
I already foresee how NASA propagandists will begin to refer to their experience of amateur photography, when they developed expired Svema film with sour solutions in their bathtub. But the **photographic materials for NASA were developed not by an amateur photographer in a tank, but by a developing machine installed in a laboratory certified by Kodak. Therefore, references to processing instability are simply inappropriate.**

*

Cameraman L. Konovalov was with you



Until next time!